Installation and user manual for fuel dispensers Series Vario 720

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2. Introduction

2.1 For the user

About this manual

This installation and user manual serves for providing the user with the necessary information and instructions facilitating complete and effective installation, parameter setting, operation and maintenance of the fuel dispenser series Vario 720. Therefore, read the corresponding chapters prior to proceeding with the installation or operation of the fuel dispenser.
Observe all danger warnings and general instructions set out in this manual.
This manual has been carefully worked out by the manufacturer and is an integral part of any fuel dispenser delivery according to the CE directive.
The manual is arranged in individual topic-related chapters and sections and has a logical structure (learn - prepare - use - maintain).
The manual and any attached documents must be kept in a safe place within reach during the whole service life of the fuel dispenser. Thus, it also constitutes an information source for operation settings and error elimination with regard to the fuel dispenser.
This manual reflects the technical state-of-the-art at the date of fuel dispenser sale or delivery.
This manual is subject to modifications and updates resulting from further developments.

Intended-use

The fuel dispensers of the series Vario 720 are only intended for fixed mounting on a base provided with the corresponding fastening points.
Only intended for the dispensing of the following liquids other than water:

- motor gasoline, diesel and bioethanol (E30 E 50 and E85)
- The EC-Type Examination Certificate was granted according to the basic requirements of the directive 2004/22/EC

See also Appendix, page 57

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2.2 Safety instructions

General

The user is liable for the observance of the contents of this manual. Any use contrary to the designated use described in this manual is not permitted. The user is solely responsible for any damage resulting from such use.

The safety instructions are not only intended for assuring the own safety but also for the protection of persons not involved against damage to property and body. Safe operation of the fuel dispenser is hereby garanteed.

The “safety instructions" must be attached in the required size according to the regulations for hazardous substances “GefStoffV”.

The symbol shown (left-hand side) is used in this installation and user manual in order to draw special attention to important information and remarks.

2.3 Safety symbols

The following symbols draw the attention to important special notes.

Attention!
This pictogram draws attention to legal regulations which must be complied with regarding assembly, commissioning and use of fuel dispensers.

Warning!
Non-observance of these requirements can lead to injury of persons and/or damage to the fuel dispenser.

Caution - electric voltage!
Warning against touching electric lines and contacts. Non-observance of these requirements can cause electric shock and lead to injury of persons and damage to property.

Explosion hazard!
Special care is required in the case of spilled fuel. Inflammable vapours may easily lead to explosion or deflagration. Therefore, such fuel must be removed immediately by means of suitable absorbent means.

Electrostatically endangered components, ESD!
This means that any contact with the contact surfaces or electr. components may lead to the destruction of the electronic control unit and put the fuel dispenser out of service.

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2.4 Additional important symbols at the fuelling station site

Explosion hazard

No smoking

No mobile phones

No open fire

The “No mobile phones” sign is especially important if one uses the mobile phone while refuelling motor gasoline at the same time.
Deflagration may occur when activating the buttons.

2.5 Basic safety instructions

Protection and safety devices

Any protection and safety devices must be checked regularly, but at the latest when carrying our maintenance work.
They may never be bypassed or ignored.
Any removed safety and proection devices must be:

- mounted again before putting into operation
- checked for correct functioning.

Make sure that the safety devices at the installation site
(e.g. Emergency Stop button, fire fighting devices) are visible and easily accessible.

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2.6 Obligations of the operator

Attention!
The fuel dispenser is a complex unit and must fulfill high requirements. Therefore, the operator is obliged to carry out the following protection measures and to observe the safety instructions.

Soiling

- It is required to clean the tanks and pipes and to check whether the fuel is pure (soiled filters in the fuel dispenser do not justify any repair under warranty!) before putting the fuel dispenser into operation.

Power supply

- Before putting the fuel dispenser into operation, the electric power supply and the correct wiring must be checked in order to prevent electric shocks and to ensure explosion protection (fuels are combustibles of class I).

Leakage

- Even in case of minor leakage in the fuel dispenser, measures must be taken to minimize the generation of vapours and to prevent escaping fuel from entering into the soil. Leakage in the interior of the fuel dispenser must be checked via the exit hole located in the middle of the front base.

Lighting

- Ensure sufficient illumination of the refuelling area.

Out of operation

- When not operated, the fuel dispenser must be protected against unauthorized use.

2.7 Compliance with instructions and regulations

Overview

- UVV - Accident prevention regulation
- VdTÜV bulletin 651 “Electric equipment of fuelling stations”
- TRbF - Technical rules for inflammable liquids
- GefStoffV - Regulations for hazardous substances

- VbF - Regulations for inflammable liquids
- VAwS - Regulations for installations used for storage, filling and handling of substances hazardous to water
- VLwF - Regulations for the storage of liquids hazardous to water
- VDE regulations
- 21. BimSchV - Regulations regarding the Federal Immission Control Law

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ESD

- Electro Static Discharge.
  Under daily conditions, persons and tools may be electrostatically charged by friction. When touching electronic components, this charge may lead to discharge and thus to destruction of the components or circuit boards.
- Therefore, this energy must be reduced by touching the protective earth (metallic housing parts) before proceeding with any work in the interior of the pump head.

Directives

The fuel dispensers are designed for use in business and industrial areas and fulfill the requirements of the

- EMC directive 89/336/EEC
- Low-voltage directive 73/23/EEC
- Machinery directive 98/37/EC
- En DIN 13617-1:2004

Installation instructions

To ensure compliance with the above mentioned directives during fuel dispenser installation, you must:

observe the installation instructions described in this manual and make sure that the metallic housing parts of the fuel dispenser and the earthing conductor are connected to the same potential and no compensation current may flow.

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2.8 Warranty

Important!
The company K + S grants a warranty for the fuel dispenser within the scope of the “General Terms and Conditions (AGB)”.

Exclusion of warranty

Warranty claims are void if one of the following points is not observed and complied with:

Personnel

- Any work as well as any interventions on the fuel dispenser require special knowledge and may only be carried out by authorized companies. The company K + S is not liable for any damage resulting from incorrect maintenance or incorrect intervention.

Original spare parts

- Any modifications of the fuel dispenser carried out without the explicit approval of the manufacturer lead to the exclusion of all liability claims towards the manufacturer. This also applies to the use of spare parts which are not produced or released by the company K + S.

Delivery

The correct functioning, safety and accuracy of each fuel dispenser are checked in the factory. The fuel dispenser is delivered together with the required approval certificates according to MID. These must be presented to the responsible authority, if required.

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3. General product information

3.1 Overview

Manufacturer

K + S ELEKTRONIK GmbH
Fuel dispensers
System technique
Pump electronics
Fuel data acquisition

Heinrich-Hertz-Straße 9
D-78052 VS-Villingen

Phone: +49 (0) 77 21 - 99 846 0
Fax: +49 (0) 77 21 - 99 846 66

Product

Fuel dispenser with liter counter, price calculator or autofuel terminal, calibratable or not calibratable.

Product designation

Fuel dispenser Vario 720

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3.2 Technical data

Hydraulic system of fuel dispenser

Capacity:

- Min. capacity 2 x 50 l/min ***
- Average capacity 2 x 80 l/min ***
- Max. capacity 2 x 140 l/min ***

*** depending on the temperature and quality of the medium.

Dispens. tolerance: ± 0.50 % with min. dispensing of 2.0 l
Max. oper. pressure: 0.18 MPa (1.8 bar); 0.25 MPa (3.5 bar) for 50 and 140 l
Electric motor: Three phases, 3 x 400 V; 0.75 kW; 1395 rpm
Three phases, 3 x 400 V; 1.35 kW; 1395 rpm
Single phase, 230 V, 0.75 kW, 1395 rpm
Electromagn. valves: +24 V DC; max. 0.500 A for proportional valves.

Electronic liter counter Price calculator

Price calculator: Power supply: 230 V; +10% -15%; 50 Hz ± 5 Hz
Power consumption: Max. 50 VA
Operating temperature: - 25 up to + 55 °C

Displays

LCD display with LED background illumination
Display for amount - quantity - basic price
Character height quantity: 2.54 mm (1")

Additional description:
Price calculator: Type VC2
Liter counter: VC1
Autofuel terminals: TDE 100 + TDE 200

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3.3 Functional description

Housing - casings
- The outer housing parts, such as doors, covers, etc., of the K+S fuel dispensers of the Vario 720 series are made of zinc- and powder-coated steel which is permitted for fuel dispensing applications.

Bearing parts
- The bearing fuel dispenser parts are made of either powder-coated hot-galvanized steel (thickness 1.5 mm) and/or galvanized steel (thikkness up to 3.0 mm).

Color
- Standard colors of the K+S fuel dispensers:
  Combination of white aluminium (RAL9006), blue (RAL5005) and black (RAL 9005).

Hydraulic unit
- Each fuel dispenser is equipped with an hydraulic unit (monoblock + metering unit) of the internationally known manufacturer BENNETT/USA. This is an hydraulic unit used all over the world and characterized by high reliability and long service life.

Piston adjustment
- The four-piston metering unit can be adjusted via one single piston.

Dispensing unit
- The dispensing unit comprises an inlet and an outlet filter, air and gas separator, stop valve and a vane pump with operating pressure control.

Encoder
- The shaft of each metering unit is equipped with a reliably operating dual-channel encoder (explosion-protected version).

Display "Liter" dispenser
- The display of the fuel dispenser with liter counter shows the quantity of dispensed fuel in liters.

Price calculator
- The display of the fuel dispenser with price calculator is divided into three parts. The total amount, the quantity dispensed and the basic price are displayed.

Hoses/ nozzles
- The hoses are made of high-quality oil-resistant rubber (shunt resistance 100 M-Ohm) and are fitted (standard equipment) with the automatic nozzle ZVA of ELAFLEX.

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Important!
A complete fuel dispenser always comprises a liter counter or a price calculator.
If the fuel dispenser is to be calibrated after installation (public section), a calibratable liter counter or price calculator is required.
A non-calibratable version is available for for non-public applications (company fuelling stations). However, this is not important for the hydraulic unit.

3.4 Description of components

Number of nozzles
- The nozzle is the part of the fuel dispenser which allows the customer to take the desired fuel. Depending on the version, each fuel dispenser can be fitted with up to two hoses for which the customer may select the fuel type and with at least one display for fuel data indication. Only one type of fuel can be dispensed at a nozzle. The K+S fuel dispensers of the series Vario 720 are fitted with up to two nozzles for up to two products.

Fuel dispenser-orientation
- All fuel dispensers can be used as a single or double pump, depending on the orientation. Double pumps allow the customer to refuel the vehicle from both sides.
  In the case of single pumps, you can have the hose installed either on the left- or on the right-hand side.

No. of products
- With the series Vario 720, it is only possible to dispense up to 2 types of fuel.

Pump capacity
- This is the max. fuel quantity which can be dispensed via the nozzle. It is indicated in liters per minute.

Display types
- Display versions for company fuelling stations (liter display) are available. The liter display shows only the dispensed quantity in centiliter and is used for fuel dispensers for, e.g., company fuelling stations.
  Fuel dispensers for public fuelling stations show also the total amount and the unit price of the product in addition to the quantity.

Number of displays
- The number of displays depends on the orientation and the number of nozzles. Up to two displays are possible.

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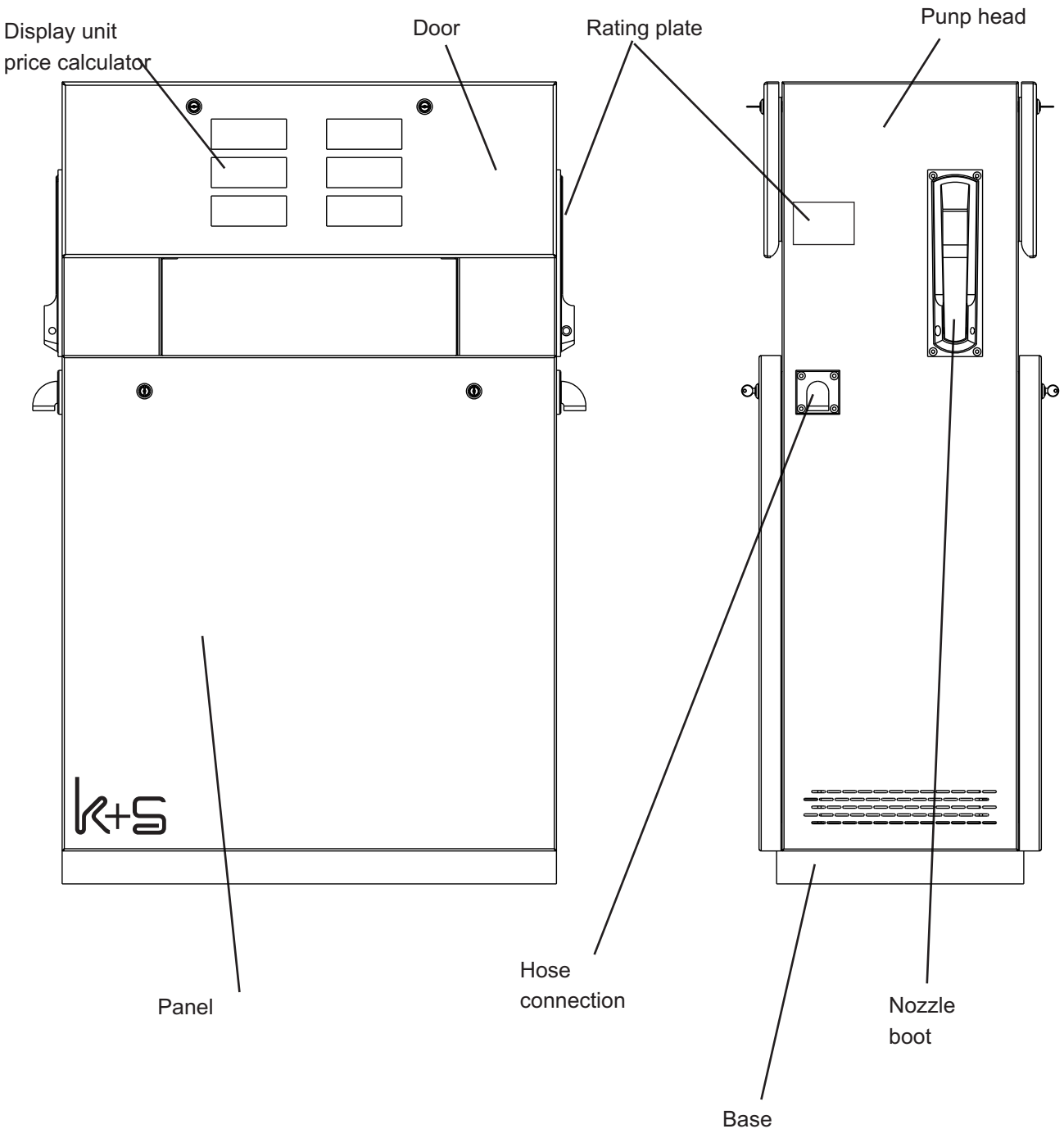
3.5 Designation of components



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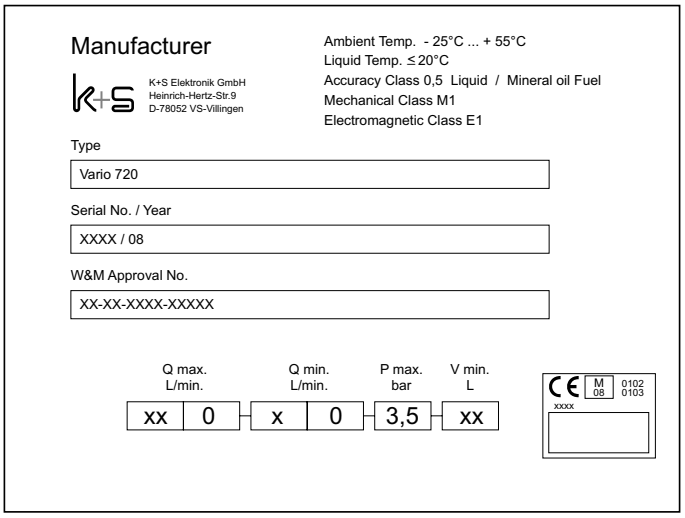
3.6 Rating plates metering unit, fuel dispenser

Metering unit

Fuel dispenser



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3.7 Explanations regarding the fuel dispenser rating plate

Important!
In the case of the calibratable version, the rating plate provides information about the performance of the conformity check according to the MID directive 2002/24/EC and the ATEX approval.

K+S Elektronik GmbH Heinrich-Hertz-Str. 9 D-78052 VS-Villingen	Name and address of the manufacturer
CE M 08 0102 0103	This designation of the dispenser means that it has been designed, manufactured and marked in conformity with the European directives. The sign M 08 with the group 0103 indicates that the conformity check has been properly carried out according to the certification of the PTB and that the dispenser can thus be installed in all EU countries. The fuel dispenser for motor gasoline corresponds to the guideline 94/9/EC - ATEX.
Dispenser for petrol, diesel and bioethanol	Scope of use of the fuel dispenser
TYPE Vario 720	Designation of the fuel dispenser type
MID TYPE NO.	No. of the approval certificate of the fuel dispenser
EC CERT. NO.	No. of the EC certificate
Qmax 50, 80 or 140 (l/min.)	Versions of hydraulic parameters
Ex II 2G IIA T3	Marking of the explosion-protected el. equipment: • Min. pump capacity II 2 - equipment for rooms subject to explosion hazard other than mines; probability of creation of explosive atmosphere - danger zone 1 • G - risk of explosion caused by gases or vapour • IIA - gas group - lowest group of risk • T3 - max. temperature of the el. equipment which might cause ignition of the ambient atmospheree (200°C)

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4. Transport, storage and unpacking

4.1 Transport

Safety instructions

The fuel dispenser and its individual components have been tested in the manufacturer's premises using a medium (e.g. spindle oil) which is not classified as a hazardous material.
Therefore, the fuel dispenser is not subject to the strict regulations for "hazardous materials transportation" when being delivered.
The customer shall agree the method of dispatch with the manufacturer. If the company K+S is responsible for dispatch, the product will be delivered to the corresponding place of destination (place of installation).

Dispatch method/ transport

The manufacturer has adequate knowledge of proper packing, loading and transportation. Therefore, the fuel dispenser is bolted to a special transport pallet and protected against external influences by its eco-friendly packing.
Should the customer desire another method of dispatch, the manufacturer shall provide professional loading, but is not liable for the method of transportation.

Storage/ case of damage

Warning!
When transporting the dispenser, only lift trucks may be used. K+S is not liable for possible damage if other handling devices are used.
Observe the following for transportation:

- The warning instructions on the information sheet included
- The total weight and the dimensions of the dispenser
- The vertical position of the dispenser. A horizontal position may damage the outer casing.
- Sufficient fastening on the vehicle. Fasten the dispenser so that it cannot move or tilt over.

Important!
During transportation, make sure that the environmental conditions (e.g. storage temperature) are complied with.

- If, despite the proper packing, a damage occurs, the company K+S must be contacted immediately.

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4.2 Storage

Important!
When storing the dispenser for an interim period, K+S recommends to store the dispenser in locations protected against fire and weather influences in order to protect the transport and packing material.

4.3 Unpacking

Important!
The transport and packing material can be used several times for reasons of environmental protection. Therefore, it should be handled carefully and returned to K+S.

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5. Installation

5.1 Safety instructions

Important!
During installation, special attention must be paid to the safety symbols and their meaning described in chapter 2.3.
Furthermore, the following must be complied with:

- The regulation regarding inflammable liquids (VbF)
- The technical rules regarding inflammable liquids (TRbF)
- The Water Resources Act (WHG)
- EU and VDE directives.

Personnel
- The fuel dispensers may only be installed by staff qualified and (authorizued fuelling installation and fuelling station constructors) pursuant to relevant standards, regulations, local regulations and the instructions in this manual.

Smoking/ open fire
- Smoking and open fire are prohibited in the complete vicinity of the dispenser.

Fuel/diesel
- Adhere to the handling instructions for fuel and diesel.

Leaks
- Check the fuel dispenser for leaks. Should you establish fuel leaks, disconnect the power supply line and contact the technical service.

Electr. connection
- The electr. connections must be carried out by qualified personnel.

Lightning protection
- A sufficient protection for the prevention of static charges and lightning strokes must correspond to the regulation TRbF.

Fire extinguisher
- Make sure that an operative fire extinguisher is available.

Protective aids
- When handling the device, use suitable protective aids.

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5.2 Installation of the fuel dispenser

First, check the place of installation of the dispenser.

Place of installation

- The so-called range of action of the nozzle (hose length plus one meter) must comply with the requirements given under "**Important!**".
- Installation below ground level is prohibited!
- All water drains must be provided with oil separators according to DIN.
- Hazardous zones around the fuel dispenser are specified according to EN 60079-10.

5.3 Foundation

Local requirements

Important!
A foundation is required for the installation of the fuel dispenser. The local conditions determine the installation height and the required foundation. If necessary, this must be clarified on the site by an architect and the owner of the fuelling stationm Tankstelleninhaber und dem installierenden Fachbetrieb klären.

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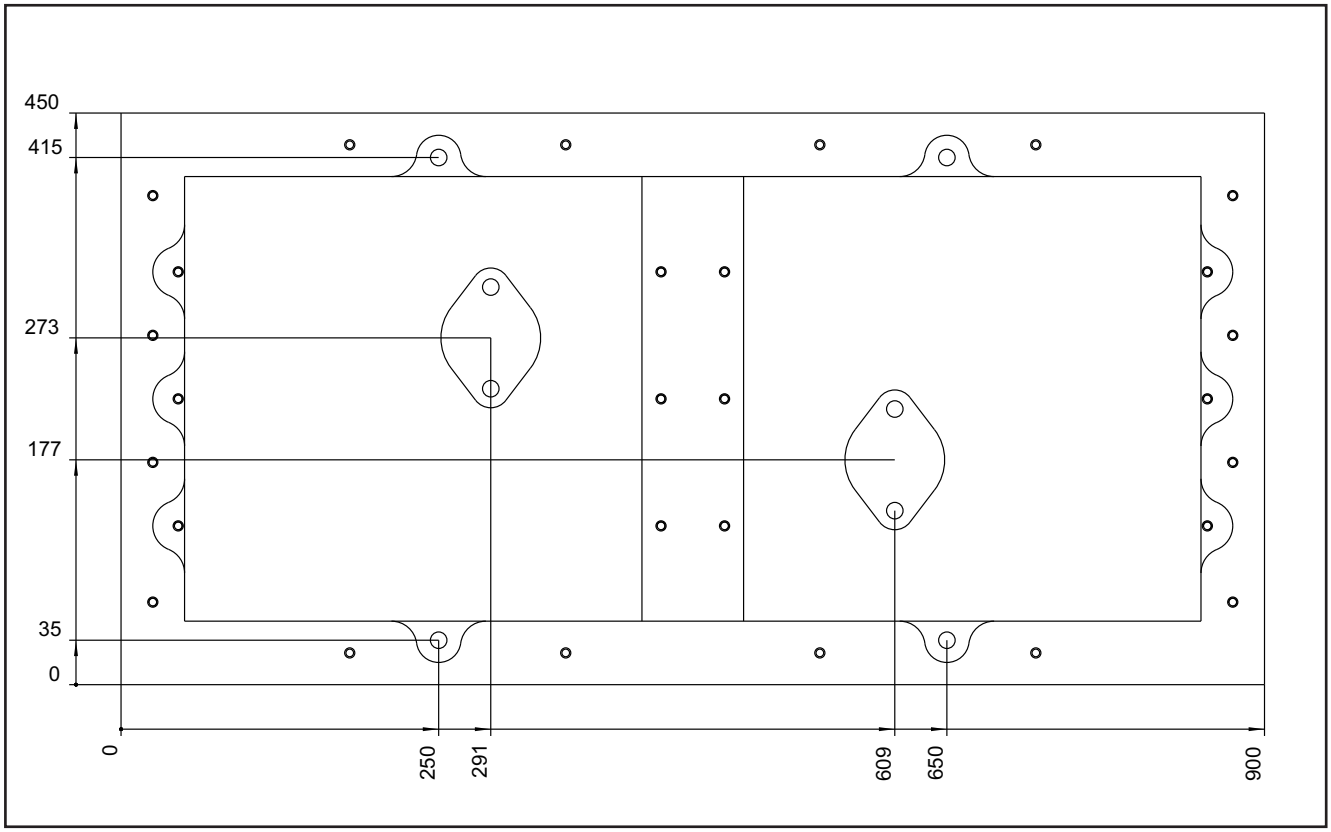
5.3.1 Foundation plan double pump



5.3.2 Foundation plan large-small volume dispensing

Drawing will follow!

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Drawing will follow!

Drawing will follow!

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Drawing will follow!

Drawing will follow!

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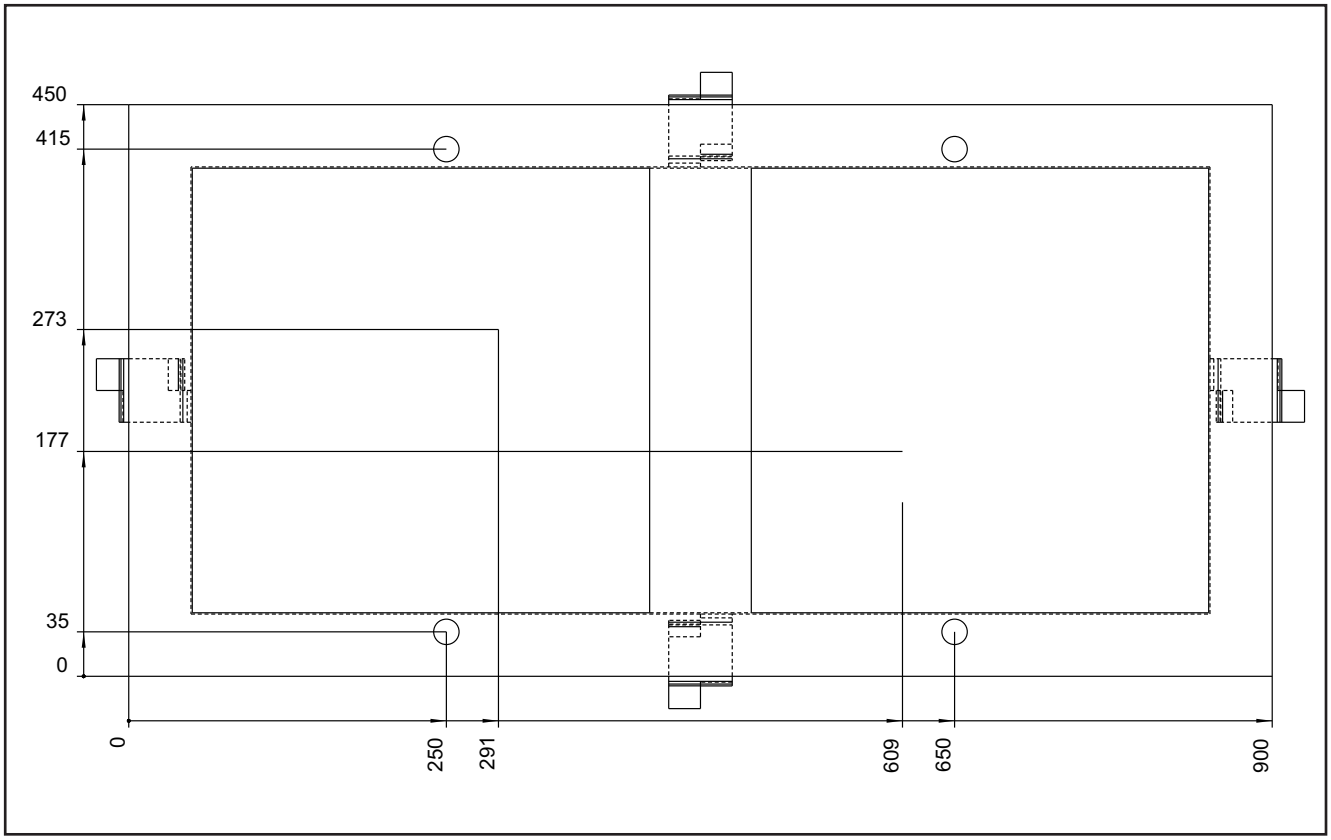
5.3.3 Foundation frame double pump



Order no. for double pump

The foundation frame is not included in the standard delivery and must therefore be ordered separately. See price list.

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5.4 Mechanical fuel dispenser mounting

Mounting

The foundation frame is seated into concrete. The front and rear fuel dispenser casings must be removed in order to fasten the fuel dispenser. The fuel dispenser is placed on the foundation frame and fixed by the screws included in the delivery.

Important!
K+S recommends installation of the fuel dispensers on islands to make sure that the moving direction of the vehicles is not important.
The dispenser orientation depends on the moving direction of the vehcile.

Distance dispenser and tank

- A maximum distance of 5.0 meters between the dispensers and the fuel tanks is recommended. Non-observance of this requirement may cause that the fuelling operation is hindered and the pump capacity (flow) is reduced. All technical requirements for fuelling stations must be complied with by the manufacturer of the fuel dispensers.

Distance dispenser and wall

- To ensure free access during cleaning and repair work, a distance of at least 1 m between the wall or building must be observed.

Fuel tanks

- Dispensers can be connected to both, underground and above-ground tanks. The steel housing must be placed on the base aligned in concrete. There, the lines leading from the tanks to the dispensers must be connected.

The supply lines leading to the dispenser must have good insulating properties to prevent inflammable liquids or vapours from entering into the fuel dispenser.

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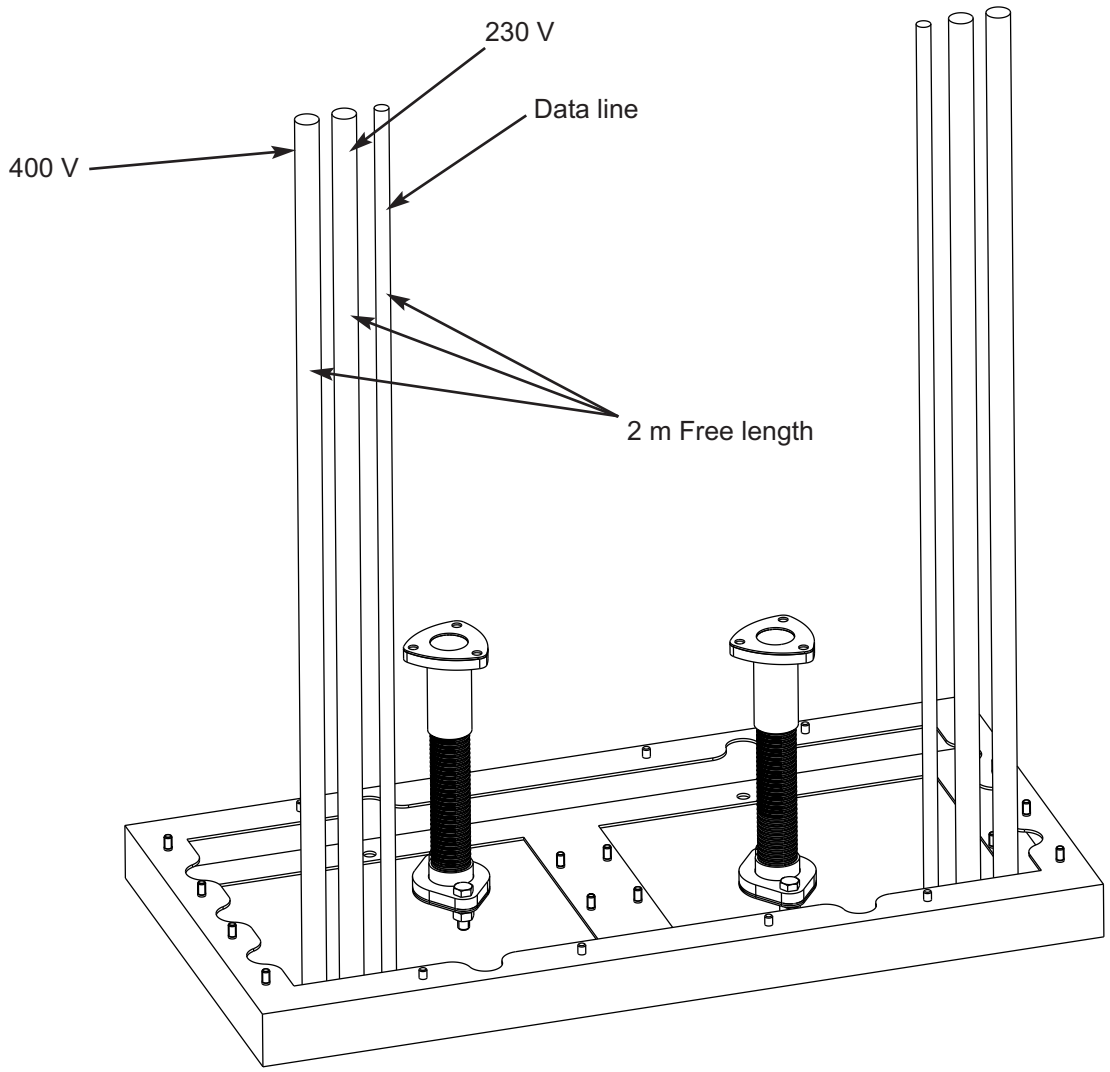
5.4.1 Electric cables

In addition to the grounding connection, the following lines must be connected in the base below the fuel dispenser:

- Power supply of the three-phase motor,
  five-wire cable NYYÖ-I 5 x 2.5
- Power supply of the calculator and the switching circuits,
  three-wire cable NYYÖ-I 3 x 2.5
- Data line - shielded eight-wire cable AYSTÖE 8 x 0.75
- Additional data line, e.g. level monitoring



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5.4.2 Connection of the hydraulic unit

Connection hydr. unit to suction line

- The corrugated pipe is connected to the suction line
- Observe the correct position of the gasket seals
- All recesses and outlets at the foundation frame must be sealed
- Attention!!! Now, the vapour recovery equipment must be connected

5.4.3 Connection and remarks concerning vapour recovery

Drawing will follow!

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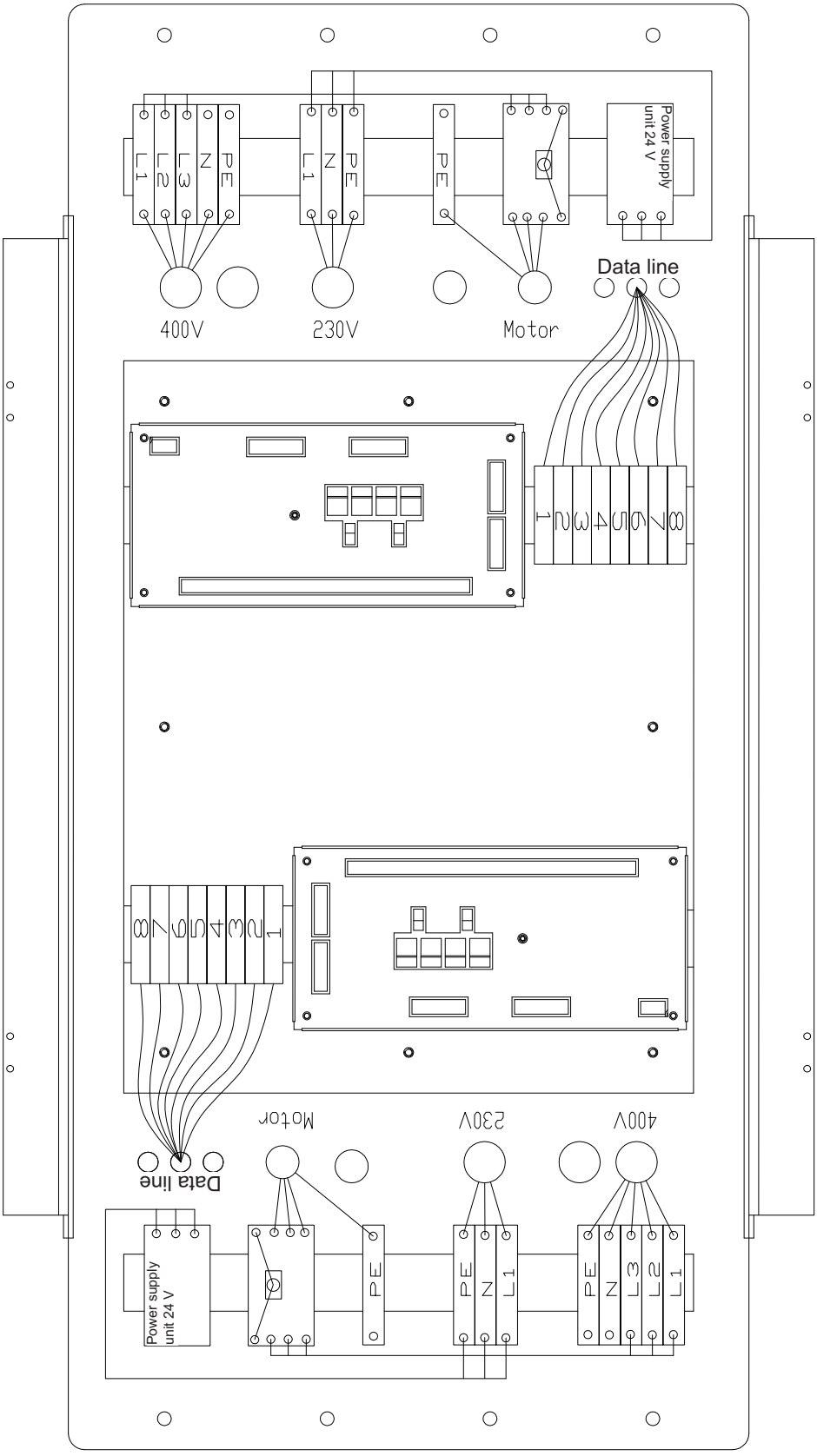
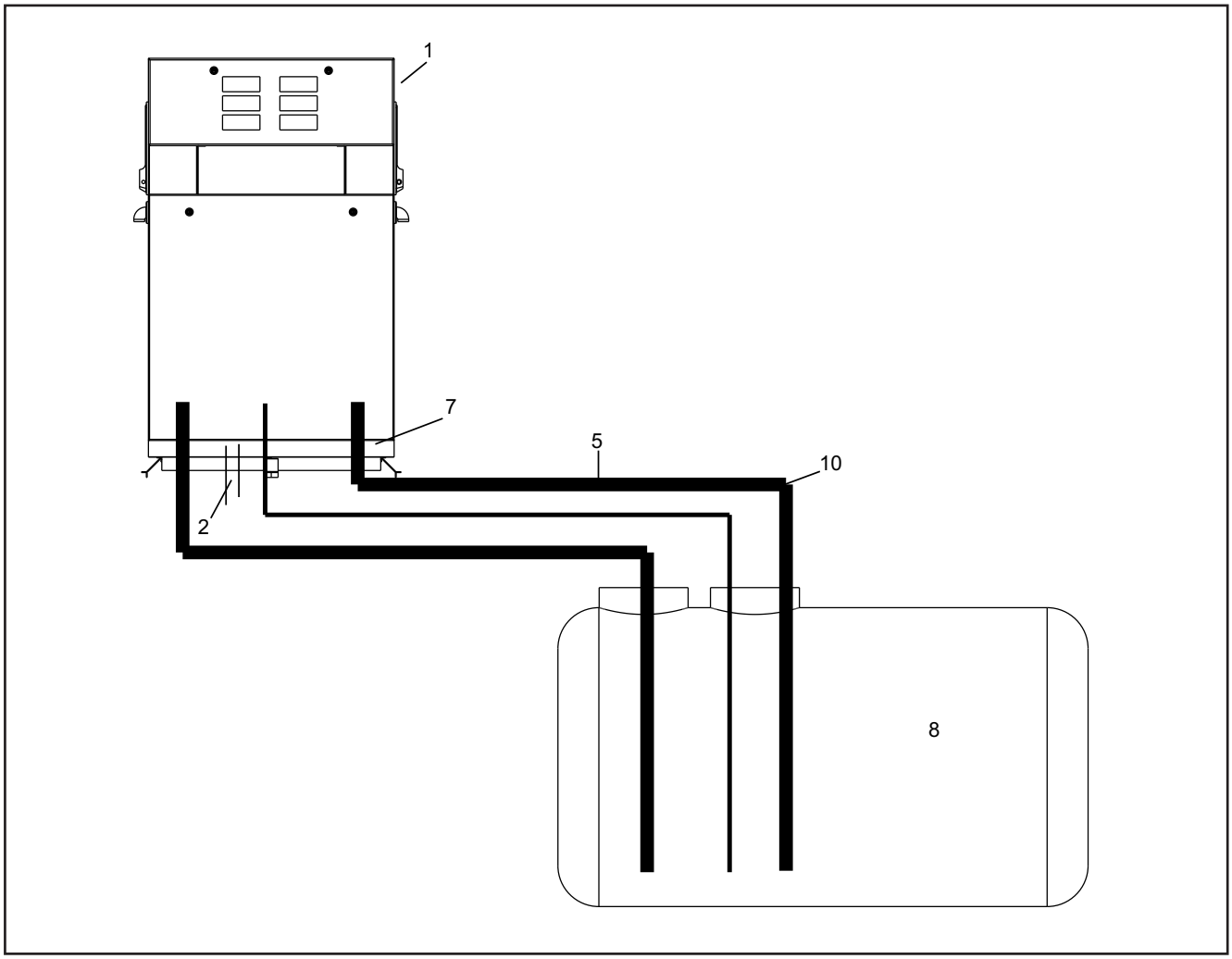
5.4.4 Electr. installation wiring



5.4.5 Underground tank

Connection to an underground tank

When connecting the fuel dispenser to an underground tank, the **check valve** must be installed in the suction line. It is intended to prevent an interruption when refuelling and the air inlet when starting the refuelling operation. The separate **check valve** must not be installed if a check valve is already installed in the inlet funnel.



Fuel dispenser installation - underground tank

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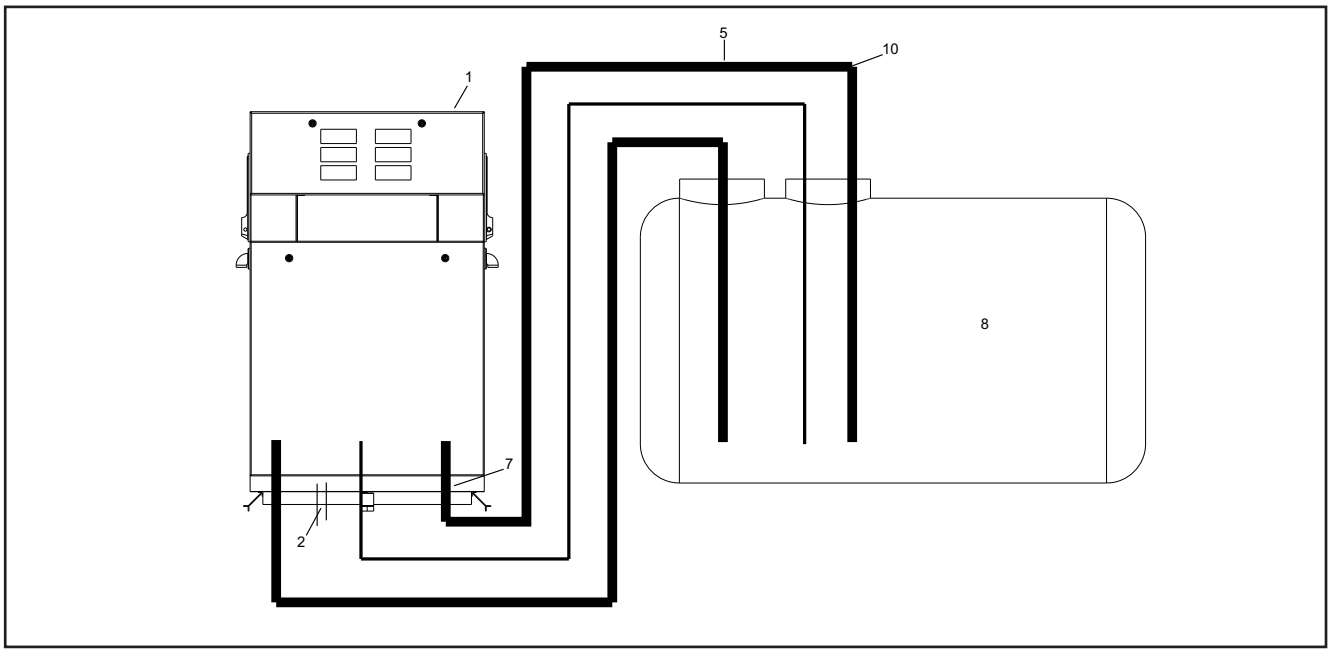
5.4.6 Above-ground tank

Connection above-ground tank

When connecting the fuel dispenser to an above-ground tank, the **ball valve** must be installed in the suction line for safety reasons. Thus, a negative pressure of approx. -0.03 Mpa of the pump is guaranteed. The **ball valve** must be installed at the lowest point in the line. These valves must be closed by the fuelling station operator if the fuel dispenser is out of operation. If these valves are not installed, **fuel leaks may be caused**.



Fuel dispenser installation - above-ground tank

Table - legend for illustration underground tank and above-ground tank

Pos.	Description	Pos.	Description
1	Dispenser	6	Not required
2	El. power supply cable and data line	7	Inlet funnel (without check valve)
3	Not required	8	Fuel tank
4	Vapour recovery cables	9	Not required
5	Suction line	10	Ball valve

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5.5 Fuel cable wiring

Cable wiring

The company K+S recommends laying the cables according to the standard, i.e. a separate line leading into the fuel tank.
It is possible to connect several fuel dispensers (pumps) to the main line, i.e. several fuel dispensers (pumps) can be connected to one single supply line.
The company K+S, manufacturer of fuel dispensers, **does not recommend this type of connection** due to possible fluctuations when suctioning fuel from the tank.

5.6 Pressure pump system

The fuel dispensers can not only be connected to systems with standard suctioning, but also to **pressure systems** in the case of which the fuel is suctioned directly from the tanks in which the central pumps are located (e.g. RED JACKET system).
Advantages of the pressure system: quiet fuel dispenser operation; disadvantage: high requirements regarding quality and tightness of the fuel lines. In the case of pressure systems, the fuel dispenser is not equipped with a monoblock.

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6. Electr. power supply

6.1 Overvoltage protection

Important!
An overvoltage caused by lightnings at a distance of several kilometers or by industrial activities can occur in all lines. The pulses generated by lightnings may destroy the complete electronics. For this reasons, an overvoltage protection is used in most countries leading the overvoltage energy to the grounding connection thus protecting the electronics. Therefore, the fuel dispenser manufacturer recommends protecting the main switch cabinet (and/or the secondary switch cabinet), supplying the fuel dispenser and the electronics (PC, POS, etc.) by means of an overvoltage protection and lightning arresters.

6.2 Uninterruptible power supply

UPS

Important!
In order to ensure trouble-free operation of fuel dispensers, it is necessary to secure the stabilized fuel dispenser feeding by an uninterruptible power supply UPS.
Current interruptions, heavy disturbances or voltage drops in peak hours (particularly during winter time) are very frequent phenomena in the power supply network. All these phenomena can be eliminated by the use of a correct uninterruptible power supply (UPS). There are two types of UPS available and suitable for the fuel dispenser: UPS offline and UPS online.
UPS (offline) is sufficient for the stabilization in the filling stations conbnected to a very stable power supply network (without any voltage drop and any disturbances). In other cases, the online version of UPS must be used. Disturbances, voltage drops or failures can result in frequent blokking of the dispensers, problems in the computer/dispenser communication, failures of computers (data loss), etc..

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In addition to the grounding connection, the following lines must be laid in the base below the fuel dispenser:

- Power supply of the three-phase motor,
  five-wire cable NYYÖ-I 5 x 2.5
- Power supply of the calculator and switching circuits,
  three-wire cable NYYÖ-I 3 x 2.5
- Data line - shielded eight-wire cable AYSTÖE 8 x 0.75
- Additional data line for, e.g. level monitoring

6.3 Wiring of the fuel dispenser

Important!
The electr. wiring of the K+S fuel dispensers requires protection against electric shocks.
All fuel dispensers in the filling station must be interconnected to the grounding network via the grounding electrode. The yellow and green conductor, section of min. **4 mm**, or a special cable can be used as grounding electrode. The grounding electrode must be connected to the grounding terminal of the fuel dispenser placed on the foundation (screw M 8), MARKED correspondingly.

All electr. lines must resist to fuel vapours and have good insulating properties because they are subject to aggresive explosion-hazardous environments for a long period.
All cable ends entering the fuel dispenser must be long enough to facilitate installation (cable end in the pump head). The cable ends must have a min. length of 2.0 m above foundation.

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6.4 Supply of the pump and vacuum pump motors

Important!
The supply of the electr. pump and vacuum pump motors of all fuel dispenser models is done via a five-wire cable **NYYÖ-I 5 x 2.5**. In the switch cabinet, the cable is connected to fuses and switches. The individual pump and vacuum pump motors are controlled via switches in the fuel dispenser.
Double pumps with two electr. motors (i.e. all fuel dispensers of the series Uni 200) are equipped with 2 contactors and **2 motor protection switches**. The motors of this dispenser type must be protected accordingly in the switch cabinet. We recommend using the motor protection switch offered by K+S for the connection of the supply cable 3x400 V. The protection switch serves as switching element and provides protection against short-circuit and overheating. To be ordered separately, see price list Accessories.

6.5 Data lines

The data line serves for remote fuel dispenser control in the so-called automatic mode (i.e. the fuel dispenser is controlled remotely by the console or the computer). The line is not required if the dispenser is operated in the manual mode only.
For the data line, at least a shielded eight-wire data line with a min. section of 0.75 mm^2 must be used!! The cable sheath must be made of flame resistant and fuel vapour-resistant material. The shielded eight-wire cable **AYSTÖE 8 x 0.75** can be used as data line. The cable is led from the operator's workplace in the kiosk into the fuel dispenser.

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6.6 Service lines

Service lines serve for special purposes. These lines are not required for the operation of the fuel dispenser. They are used in order to remotely control certain fuel dispenser functions or to send certain signals from the fuel dispenser. In order to decide whether a service line is required, you must always contact the personnel of the company K+S Elektronik GmbH.

6.7 Trouble-free cable installation

Important!
To ensure correct operation of the fuel dispenser, die signal lines of the fuel dispensers **must** be separated correctly from the power supply lines. Parallel connection of the power supply lines and signal lines without separation results in disturbances and undesirable parasite phenomena which may cause problems of the fuel dispenser control and/or complete destruction of the electronics in the fuel dispenser and in the kiosk. Therefore, any crossing or parallel laying (in a single bundle) of the signal and power cables has to be avoided in any case. Separate cable channels (e.g. metal tubes) for power and signal cables represent a suitable solution. **The manufacturer is not liable for damage caused by unsuitable laying and wiring of cables/lines!**

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7. Fuel dispenser operation

7.1 Instructions for safe fuel dispenser operation

Important!
The fuel dispenser is a complex system which must fulfill a number of demanding functions. Prior to putting the fuel dispenser into operation, it is necessary to clean the tanks and lines and to check whether the fuel is pure. For putting the fuel dispenser into operation, the electr. power supply and the correct wiring must be checked to prevent electric shock and to provide fire safety.

Prohibited!

- Smoking in the vicinity of the dispenser
- Open fire in the filling station area
- Use of a mobile in the vicinity of the dispenser
- Dispensing while the engine is running

7.2 Putting the fuel dispenser into operation

Important!
Switching the fuel dispenser on and off is carried out in the master switch cabinet of the filling station where the fuel dispensers are connected. Each fuel dispenser has three power supply outlets with protection switches in the master switch cabinet:

- Supply of the electr. pump and vacuum pump motors (3 x 400 VAC)
- Supply of the electronic fuel dispenser calculator (230 VAC stabilized)
- Supply of the valves, control of the electr. pump and vacuum pump motors (230V not stabilized)

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Recommendation

Switch the fuel dispenser on as follows:
Switch on the 230 V protection switch for stabilized supply of the electronic fuel dispenser calculator (all display segments are tested automatically and the values of the last fuelling operation are displayed).
Switch on the 3 x 400 V protection switches for the supply of the pump and vacuum pump motors.

7.3 Checking/changing the direction of rotation of the motor

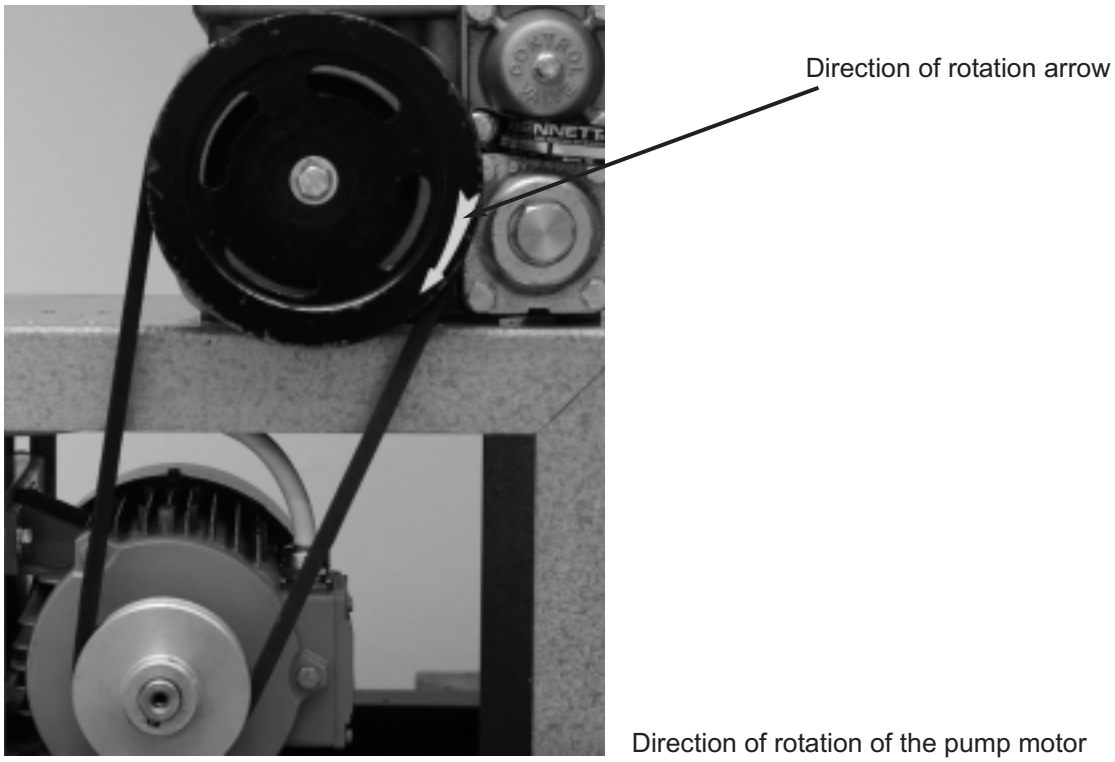
Before putting the fuel dispenser into operation, the direction of rotation of the pump motor must be checked.

Important!

To carry out this check, the v-belt between the pump and the motor must be removed in order to avoid any failure of the pump and the encoder which can be caused by an incorrect direction of rotation.
Remove shortly the nozzle and compare the direction of rotation of the motor with the direction indicated by the arrow on the pump pulley.
See also the following drawing.

Change direction of rotation

If the direction of rotation must be changed, switch off the power supply of the motor first.
To obtain the correct direction of rotation, simply change two cables in the junction box of the motor (e.g. L1 and L2).



Direction of rotation of the pump motor

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7.4 Operation of the fuel dispenser

Attention!
The owner of the filling station is liable for its operation.
He must supervize fuelling operations and instruct the customer regarding correct use of the fuel dispenser in case of improper use. The owner must mark the dangerous zone of the filling station by means of appropriate symbols (smoking prohibited, no open fire, driving direction, etc.). The operating manual of the filling station and/or information about the general obligations must be accessible to the customer.

7.4.1 Fuel dispensing

Note!
The fuel dispenser is activated by removing the nozzle from the nozzle boot. The integrated contact releases the liter counter/price calculator which is automatically reset to zero. The pump motor starts and the fuelling operation begins. The fuel flows by pressing the nozzle and stops by releasing the nozzle. The user must place the nozzle back into the nozzle boot. Thus, the valve contact interrupts the power supply of the pump motor. The dispensed quantity remains displayed on the liter counter until the nozzle is operated again.

Data storage

With the autofuel terminal, the quantity and the unit price are saved for a period of 90 days for fiscal reasons.

In the case of self-service filling stations, nozzles with locking are used. The flow is controlled via the locking lever. In the basic version, the nozzle is supplied with lever locking. To activate the lever locking, it must be pressed during the fuelling operation. When releasing the lever or the nozzle drops out of the filler neck, the flow is stopped. The stop function is activated as soon as the tank is full (overlow sensor). The fuelling operation is stopped even if the locking lever is still pressed. The safety function is also activated in case of improper use of the nozzle, e.g. if the nozzle deviates by more than 15 degrees from the horizontal plane, the flow is stopped (even if the operating lever is pressed). After activation of the stop and safety function, the locking lever must be released.

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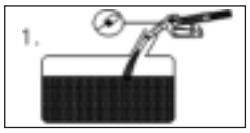
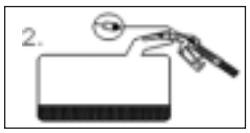
7.4.2 Position of the nozzle



Correct position of the nozzle during fuelling.
The nozzle is in a vertical position; the valve does not block the air supply and the fuel can flow.



Incorrect position of the nozzle.
The nozzle swivels and is no longer in a horizontal position. The valve blocks the air supply and the fuel supply.

7.4.3 Operating mode of the fuel dispenser

Attention!
Before switching the automatic mode to the manual mode, the service technician must be contacted.

7.5 Switching the fuel dispenser off

Remark!
Switch the fuel dispenser off as follows:

1. Switch off the 3 x 400 V protection switch of the pump and vacuum pump motor supply
2. Switch off the 230 V protective switch for the stabilized supply of the electronic fuel dispenser calculator
3. Switch off the uninterruptible power supply UPS in the kiosk via the switch located on the console (the yellow indicator lamp of the USP goes off)

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8. Maintenance and service

Attention!
Prior to starting any maintenance work on mechanical, hydraulic or electric parts/components, it is always necessary to disconnect the fuel dispenser from the power supply source and to protect it from re-connection.

Note!

- Do not remove the casings of the fuel dispenser during operation.

- The belt between the motor and the pump (and/or suction pump) is an antistatic belt. This belt must not be replaced by another type of belt.

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8.1 Instructions for maintenance

Instructions for fuel dispenser maintenance

- Maintain all fuel dispenser components clean so that possible unforeseeable faults can be dientified easily and removed quickly.
  Never use a high-pressure cleaner to clean the fuel dispenser.
- Check all connection elements systematically and, in case of fuel leaks, retighten the connection elements and/or seal them.
- Check and adjust the v-belt tension (if required).
- Check and tighten the screws by means of which the electr. motor is fastened on the console.
- Check the condition of the nozzles and decide its repair or replacement, depending on the revealed defect.
- Check the correct functioning of the door locks and the nozzle boot.
- Regularly check the tank for oil residues/mud, water residues and other impurities and clean.

8.2 Maintenance of the housing

Housing

Note!
Parts of the fuel dispenser housing are made of powder and zinc-coated steel or stainless steel. These parts need regular maintenance, particularly during the winter season, because aerosols of chloride preparations arisen from the salts used for road maintenance can result in permanent damage to lacquers of untreated body parts and/or to intercrystalline corrosion. Pay attention to the corrosion of guards. Use water and/or solutions of detergents and available car care products for the regular maintenance of the fuel dispenser housing.

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Note!
The company K+S Elektronik GmbH offers annual inspections of the filling stations carried out by its dealers.

9. Technical specifications

Pump capacity	Min. capacity	40 l/min
	Average capacity (/H)	80 l/min
	Max. capacity (/UH)	140 l/min
Pumping tolerance	Min. capacity	± 0.25% with min. dispensing of 2.0l
	Average and max. capacity (/H & /UH)	± 0.5% with min. dispensing of 3.0 l
Max. operating pressure	Min. capacity	0.18 MPa (1.8 bar)
	Average and max. capacity (/H & /UH)	0.25 MPa (2.5 bar)
Viscosity of the fuel		Max. 21 mm^2 s^-
Suction height	Recommended	3.0 m (to achieve the nom. capacity)
	Max.	Max. 3.5 m
Encoder	Eltomatic	2-channel, 2 x 5 VDC, NPN open collector 2 x 50 imp/rev. = 100 imp./l
Electr. motors (fuel pump)	Siemens type 1MA 7083-4	3 x 400V; 0.75kW, 1395 rpm, 2.05 A
	Siemens type 1MA 7083-4	3 x 400V; 1.35kW, 1395 rpm, 3.20 A
Electr. motors (vacuum pump)	Dürr type Mex 0544 1250 K	230 VAC, 310 W, 1.35 A
Motor protection switch		MS116
Valves	Proportional valves	24V DC
Displays	Quantity	From 0000.00 to 9999.99 l/min

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9.1 Hydraulic components

Note!

Vane pump:	hydraulic pump type T 75 stroke piston meter type SB 100
Gear pump:	hydraulic pump type GP 20 stroke piston meter type PM 80

9.1.1 Stroke piston meter PM 80

The PM 80 piston meter is compatible with the GP 20 pump. It is used as a “measuring instrument” for accurate and reliable measurement of “liquids other than water”.

Product specifications

Volume per revolution	0.5 liters
Outlet shaft diameter encoder	10 mm
Rotation direct. of outlet shaft encoder (top view)	Clockwise
Dimensions horizontal vertical (incl. drive disk)	 200x220 mm 197 mm
Cylinder diameter	72.4 mm
Crankshaft eccentricity	14.93 mm
Stroke (pistons 2 and 4)	29.86 mm
Stroke (pistons 1 and 4) adjustable between and	 28.35 mm 31.39 mm
Minimum mechanical adjusting device increment	0.05 %
Working pressure	3.5 bars
Flow rate capacity within +/- 0.3% minimum flow maximum flow (objective)	 2 l/min 80 l/min

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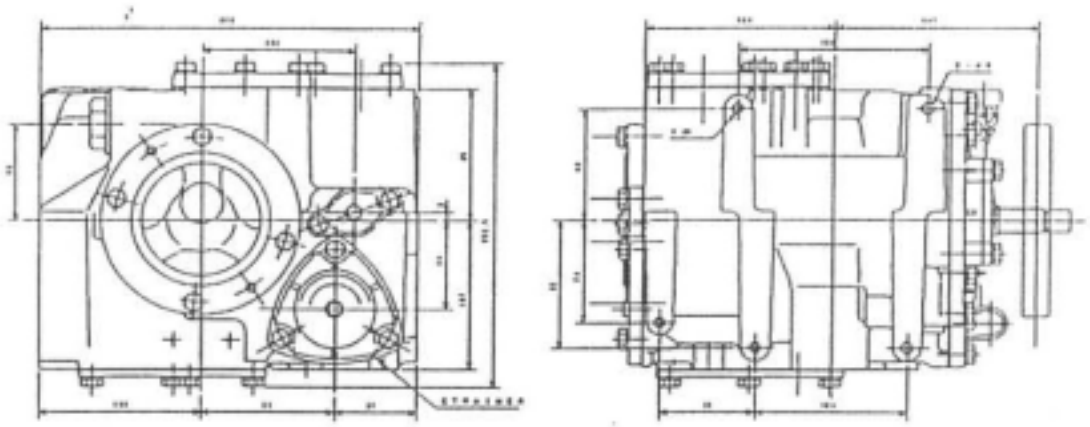
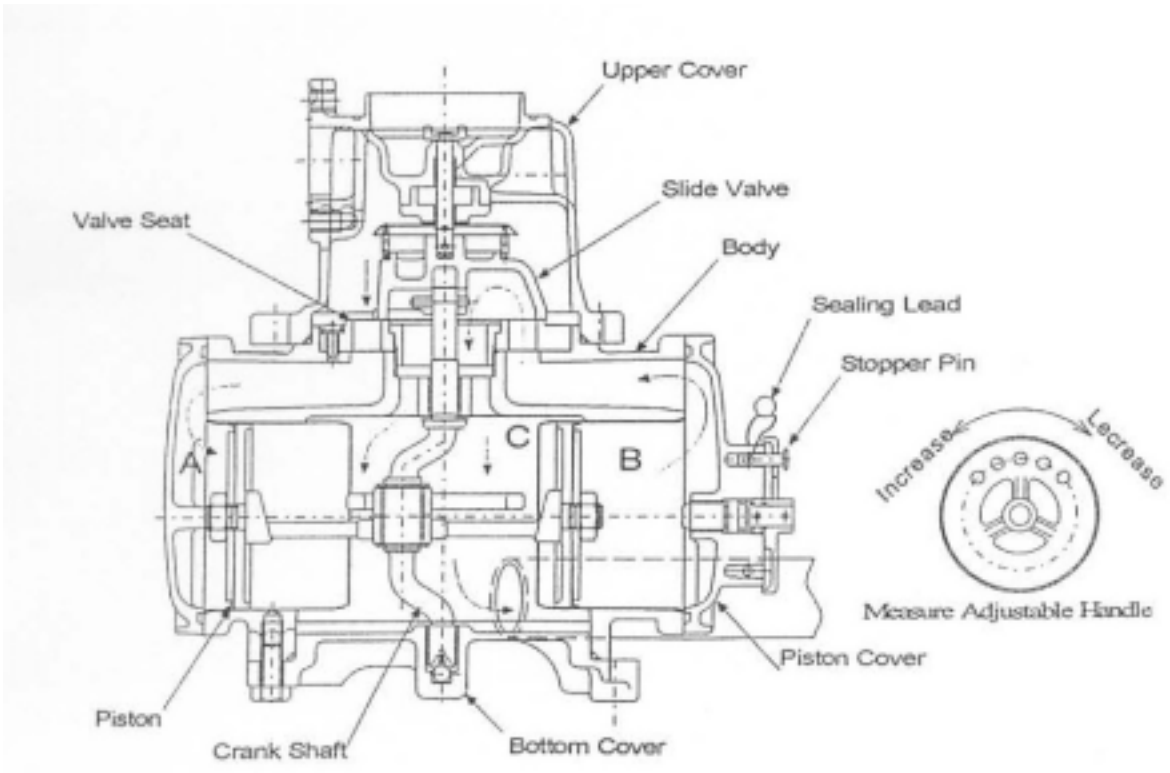
9.1.2 Hydraulic pump GP 20 - illustration



9.1.3 Stroke piston meter PM 80 - illustration



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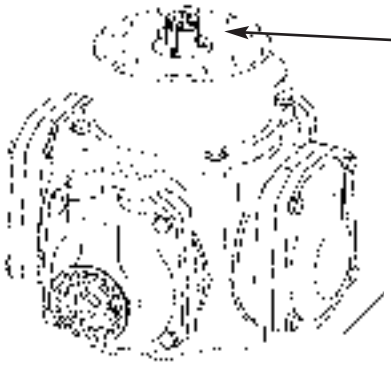
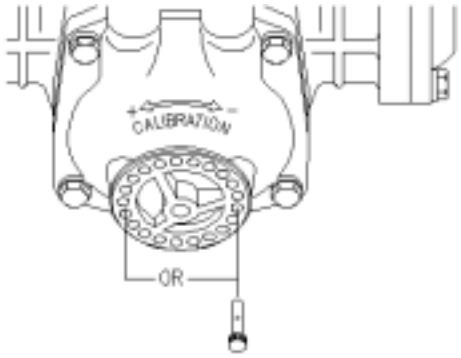
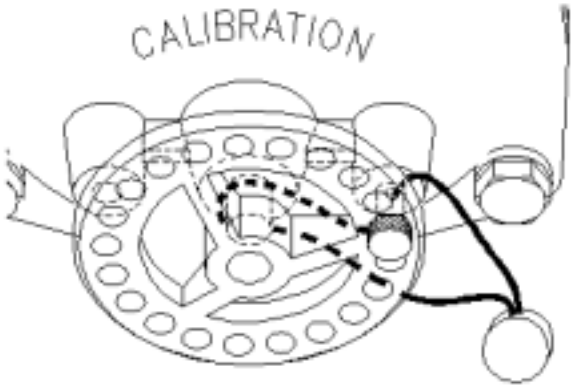
9.1.4 Stroke piston meter SB-100



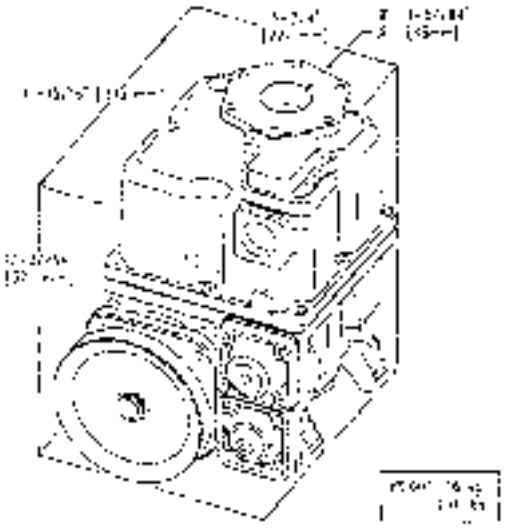
For encoder mounting, connecting shaft D=10 mm





Ill. protection by calibration authority

Note!
The hydraulic pump is equipped with an input filter and an air seaparator. Thus the fuel is lead to the stroke piston meter.



Pump speed (rpm)	450	700
Max. flow (m^3/h) Min. flow (m^3/h) Noise level (dB) Bypass pressure (b) Motor power (kW)	3 0,3 58 1.8 (adjustable 1.2 - .,5) 0.75	5 0,5 72 2.0 (adjustable 1.2 - 2.5) 0.75
Air elimination	According to OIML, CEE 77,313 regulation	
Micron filter (µ)	10, according to conditions of use	

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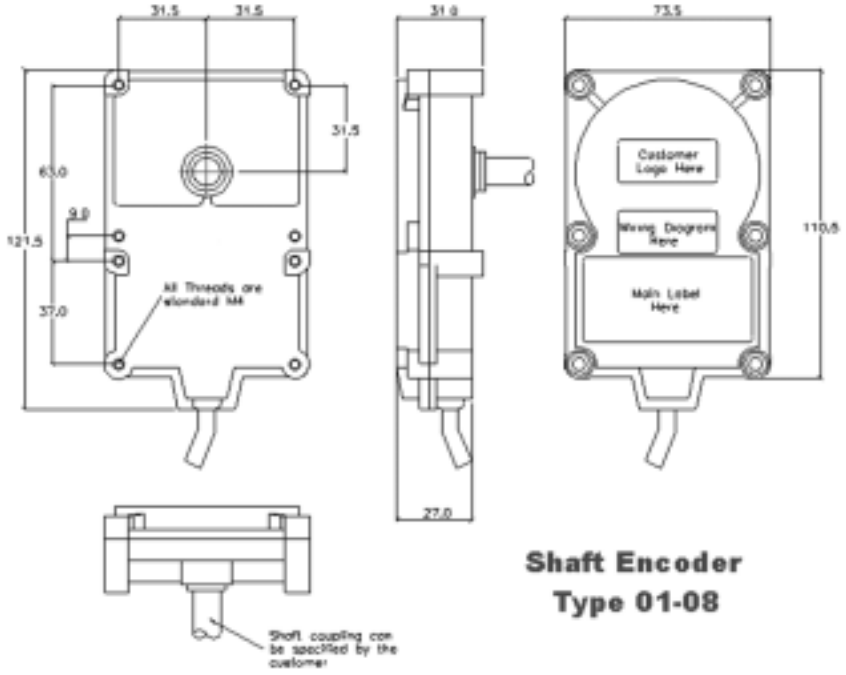
9.1.5 Encoder

Note!

The encoder and the stroke piston meter form a fixed and tamper-proof unit. This is additionally ensured by a protection device of the calibration authorities (wire and an anti-tamper seal made of lead). The connection to the fuel dispenser calculator is carried out by means of a safe cable connection with dual-pulse transmission. In the calculator, both pulse sequences offset by 90° are checked for compliance. According to the regulations, the encoder is approved in compliance with the UL and ATEX.



Specifications

Voltage supply	5 V DC +- 5%
Cable length	2 m
Pulses	2 x 50/rev.
Direction of rotation	Clockwise
Freewheel clutch	Yes

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9.2 Motor types used

The following four motor types are used for all fuel dispensers of the series Vario 720:

Electr. pump motor Version 1	Electr. pump motor Version 2	Electr. pump motor Version 3	Electr. pump motor Version 4
Asynchronous motor	Asynchronous motor	Asynchronous motor	Asynchronous motor
Type 1MA7083-4BA10	Type 1MA7096-4BA10	Type V80 MB	Type MEX 0544 1250 K
230/400V; 50Hz	230/400V; 50Hz	230 V; 50Hz	230 VAC; 50Hz
Current 2.05 A	Current 3.2 A	Current 2.00 A	Current 1.35 A
Power consumption 0.75 kW	Power consumption 1.35 kW	Power consumption 0.75 kW	Power consumption 0.31 kW
1395 rpm	1395 rpm	1410 rpm	2830 rpm
IP 55	IP 55	IP 54	IP 54
T3, t_E = 16 sec	T3, t_E = 16 sec	T3	T3
cos φ = 0,75	cos φ = 0,75	cos φ = 0,72	cos φ = 0,75
Ex II 2 G EEx e II T3	Ex II 2 G EEx e II T3	Ex II 2G EEx d II B T3	Ex II 2G EEx d IIB T3
PTB 01 ATEX 3259	PTB 01 ATEX 3259	CESI 03 ATEX 023X	PTB 04 ATEX 4002
Manufacturer: Siemens Electric motor	Manufacturer: Siemens Electric motor	Manufacturer: RAEL motori elettrici S.r.l.	Manufacturer: Dürr

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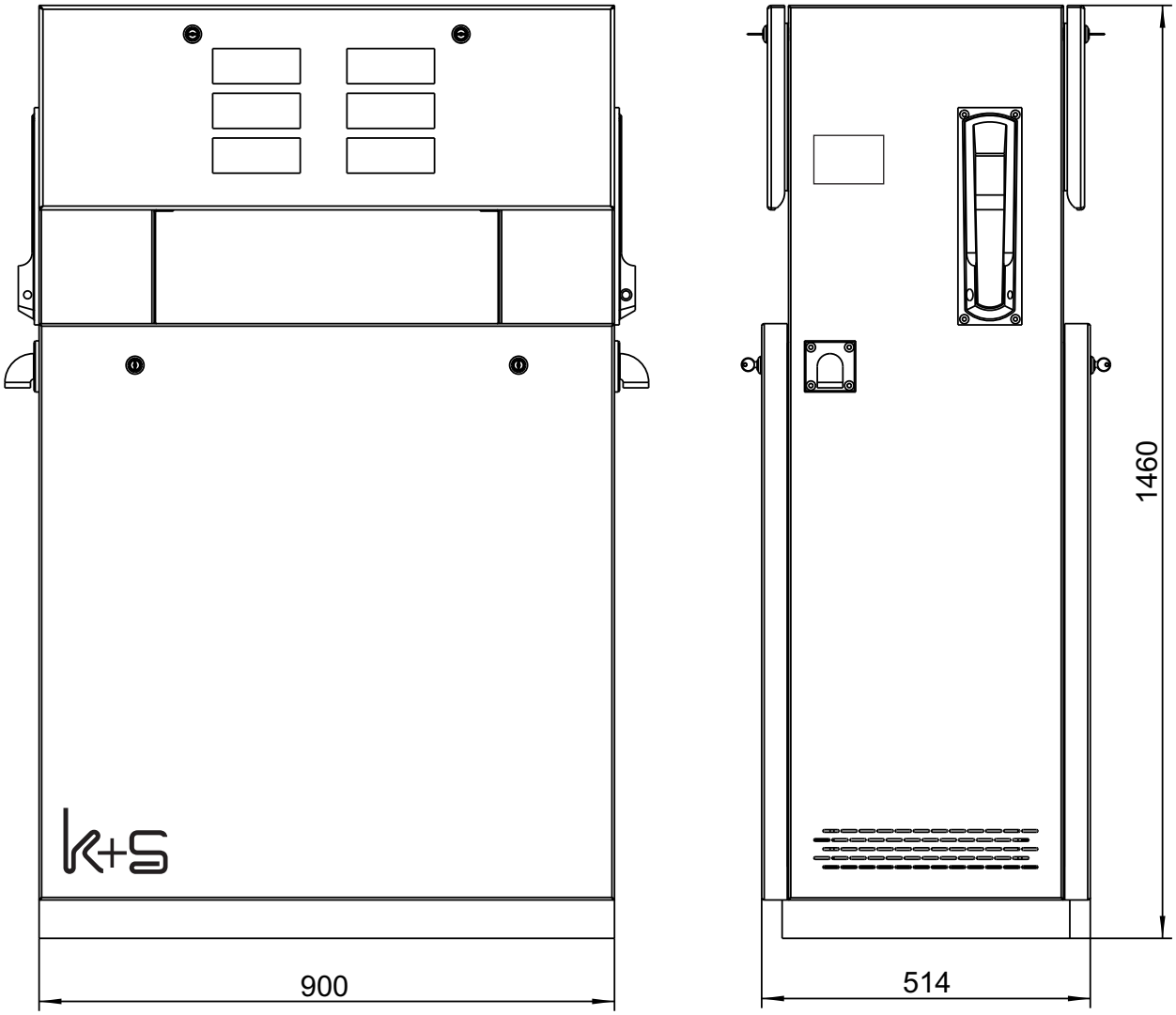
10. Fuel dispenser dimensions

10.1 Double pump



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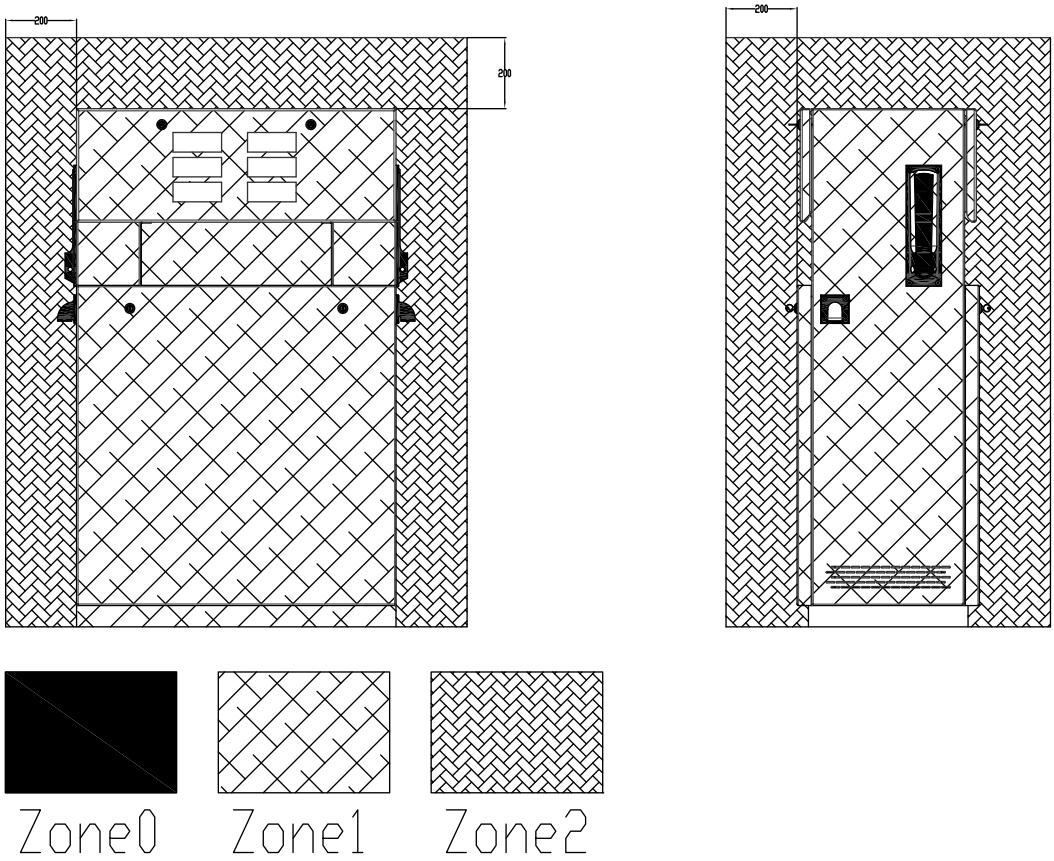
11. Hazardous areas



Drawing assignment of explosion-protected zones according to EN 13617-1

Pos.	Description	Pos.	Description
0	Zone 2	3	Zone not subjet to danger of explosion (IP54)
1	Zone 1	4	Vertical division - type 1 (detail)
2	Zone 0	5	Explosion-protected cable connection EEx e II (IP67)

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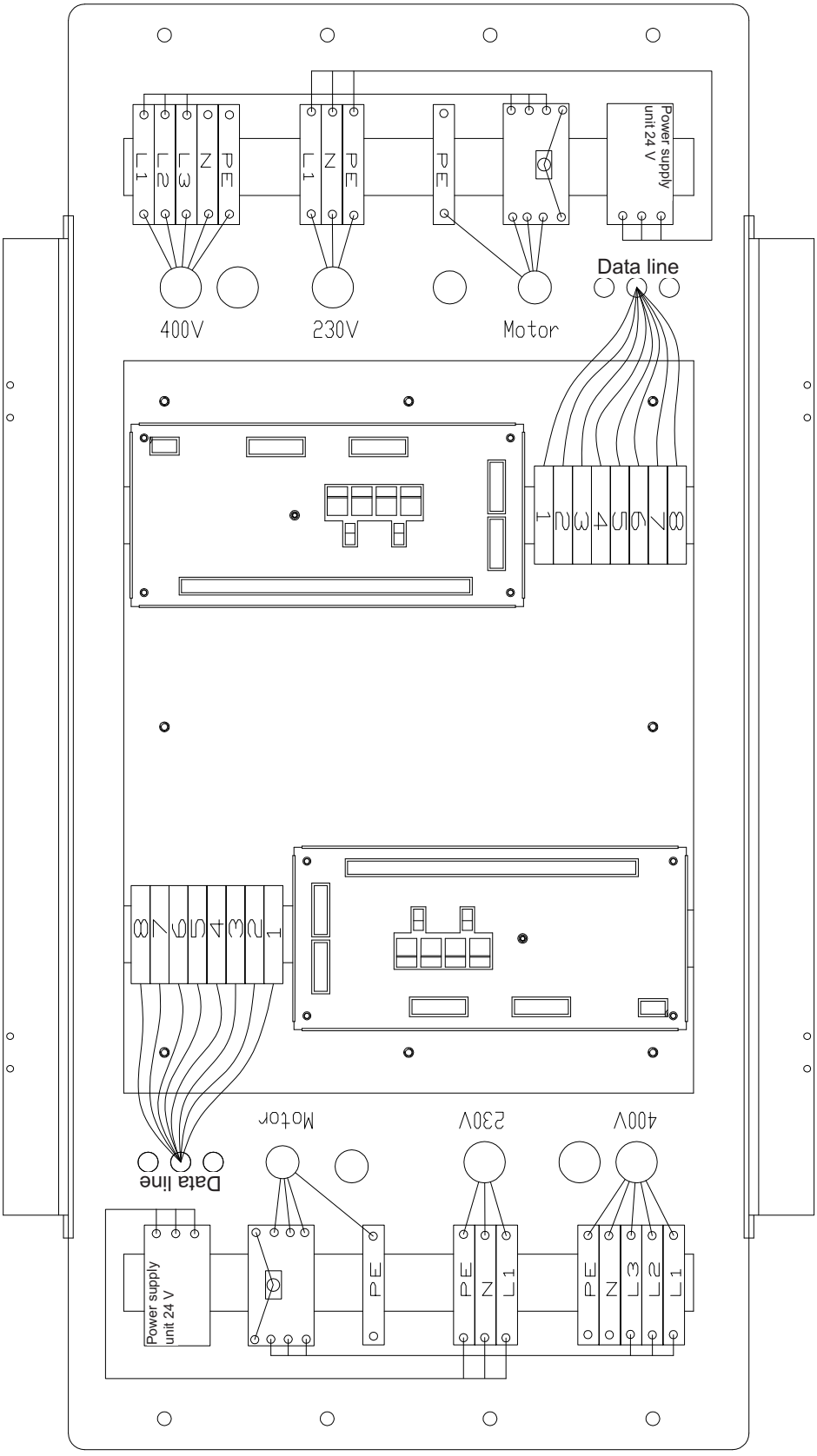
11.1 Wiring diagram



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12. Troubleshooting

12.1 Safety instructions

Before starting the elimination of any failures of a defective fuel dispenser, the following safety instructions must be complied with.

Warning!
Any intervention regarding the elimination of errors and repair of a defective fuel dispenser requires special knowledge. This work may be carried out only by trained pesonnel and authorized companies.

Dangerous voltage!
Prior to starting any work on the electr. supply of fuel dispenser components, it is always necessary to disconnect the fuel dispenser from the power supply source and to protect it against re-connection!

Warning!
Never reach your hands in the v-belt area while the pump motor is running. This may result in serious or crushing injuries. Pay also attention to clothes being caught in.

ESD!
When carrying out any work on electronic components, e.g. replacing the control electronics, first touch grounded metal parts. Thus, any possible charges are discharged.

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12.2 Malfunctions

12.2.1 Pump does not dispense fuel

Failure	Cause of the failure	Elimination
Motor not running	Power supply failure	First, check all fuses, switches and motor protection switches in the switch cabinet as well as the connection cables for: • the fuel dispenser - motor - nozzle contact - cable connection - junction box • the price calculator - check fuses - check for short-circuit - check contactor
	Motor defective	Replace the defective motor
Motor does not run smoothly	Failure of the belt drive	Check: • the fuel dispenser • v-belt oiled up, clean v-belt pulleys • replace broken v-belts

12.2.2 Reduced or no fuel dispensing

Failure	Cause of the failure	Elimination
Pipings, hydraulic connections	Suction line not tight	• Seal suction lines • Check screw connections for tightness, retighten if necessary • If required, replace defective seals
Motor drive	Uneven running, generation of noise	• Remove oil deposits • Replace defective b-belt • Check v-belt pulleys, clean and retighten the screws • Check v-belt tension, adjust, if necessary
Pump	Sluggish pump drive	• Check for wear and excessive backlash • Contact technical service!
Dispensed fuel volume too low	Soiled filter	• Clean all suction and outlet filter strainers, replace, if necessary
Piston meter 	Sluggish	• When the pump operates at high capacity, replace the piston meter • Contact technical service! • **Recalibration required!**
Nozzle The fuel does not flow while the nozzle is released	Restrainer soiled, etc., valve cone and seat blokked due to fuel deposits	• Replace nozzle • Contact technical service!

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12.2.3 Vapour recovery failure

Failure	Cause of the failure	Elimination
Nozzle with coaxial tube	Pump capacity too low	• Replace nozzle
Vacuum pump	Vapour separation affected	• Vacuum pump defective • Contact technical service!
Drive	Uneven running	• Replace motor drive
Vapour recovery	Incorrect functioning	• If there are no visible perturbations, contact technical service!

12.3 After troubleshooting

Important!
Mount again all casing covers after maintenance and repair work and close the pump head. Check all loosened screw connections for tight seat.
Carry out recommissioning only according to the relevant instructions. Take the necessary measures to ensure that the fuel dispenser is only operated in a safe and functional state.
Carry out a test run!

Attention!
After any intervention on the hydraulic installation and the vapour recovery equipment, the volume rate must be checked.

Carburetor pump

13. Test certificates and other certificates

13.1 EC declaration of conformity

EG-Konformitätserklärung
EC - Declaration of Conformity
EC - Declaration de Conformité

Wir / We / Nous — **K + S Elektronik GmbH**

Anschrift / Address — **Heinrich-Hertz-Straße 9**, **D-78052 VS-Villingen**

erklären, dass das Produkt mit der Bezeichnung, Typ, Modell:
declare, that the product with name, type, model:
déclarons, que le produit nom, type, modèle:

Kraftstoffzapfsäule Serie Vario 720

mit den Anforderungen der Normen und Richtlinien
fulfils the requirernents of the standards and regulations of the Directive
satisfait aux exigences des normes et directives

Maschinen-Richtlinie 98/37/EG, 1998
EN 292-1/2 Sicherheit von Maschinen
EN 60204-1 Elektrische Ausrüstung von Maschinen
MID-Richtlinie 2004/22/EG
OIML R 117: 1995
OIML D 11: 2004
WELMEC Guide 7.2, 10.5
ATEX 94/9/EG
Niederspannungs Richtlinie 73/23/EWG
EMV-Richtlinie 89/336/EWG
EN 55011 (1998) + A1 (1999) + A2 (2002), Limit Class: B
EN 61000-3-2 (2006-04)
EN 61000-3-3 (1995-01) + A1 (2001-06) + A2 (2005-11)
EN 61000-4-2 (2001)
EN 61000-4-3 (2001)
EN 61000-4-4 (2001)
EN 61000-4-6 (2001)
EN 61000-4-11 (2001)

und den Prüfberichten übereinstimmt und damit den Bestimmungen entspricht.
and the test reports and therefore corresponds to the regulations of the Directive.
et les rapports d'essais et, ainsi, correspond aux règlements de la Directive.

Ort und Datum der Ausstellung:
Place and date of issue:
Lieu et date d'établissement:

VS-Villingen, den 12. März 2007

Name und Unterschrift des Befugten:
Name and signature of the authorised persons:
Nom et signature des personnes autorisées:

Leitung Entwicklung

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13.2 Type Examination Certificate of the PTB (physical technical federal institute)

Approval expected soon!

13.3 QMS certificate

ZERTIFIKAT ◆ CERTIFICATE ◆ ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD Management Service

CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH

certifies that

K + S Elektronik GmbH
Heinrich-Hertz-Str. 9
D-78052 Villingen-Schwenningen

has established and applies
a Quality Management System for

Development, production and sale of
dispenser systems with electronic display.

An audit was performed. Report No. **70729659**
Proof has been furnished that the requirements
according to

ISO 9001: 2000

are fulfilled. The certificate is valid until **2010-10-15**
Certificate Registration No. **12 100 32328 TMS**

TÜV SÜD

M. Mogel

Munich 2007-10-21

IAF

DMS-TGA-ZM-07-03

TÜV SÜD Management Service GmbH • Certification Body • Ridlerstraße 65 • 80339 München • Germany

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